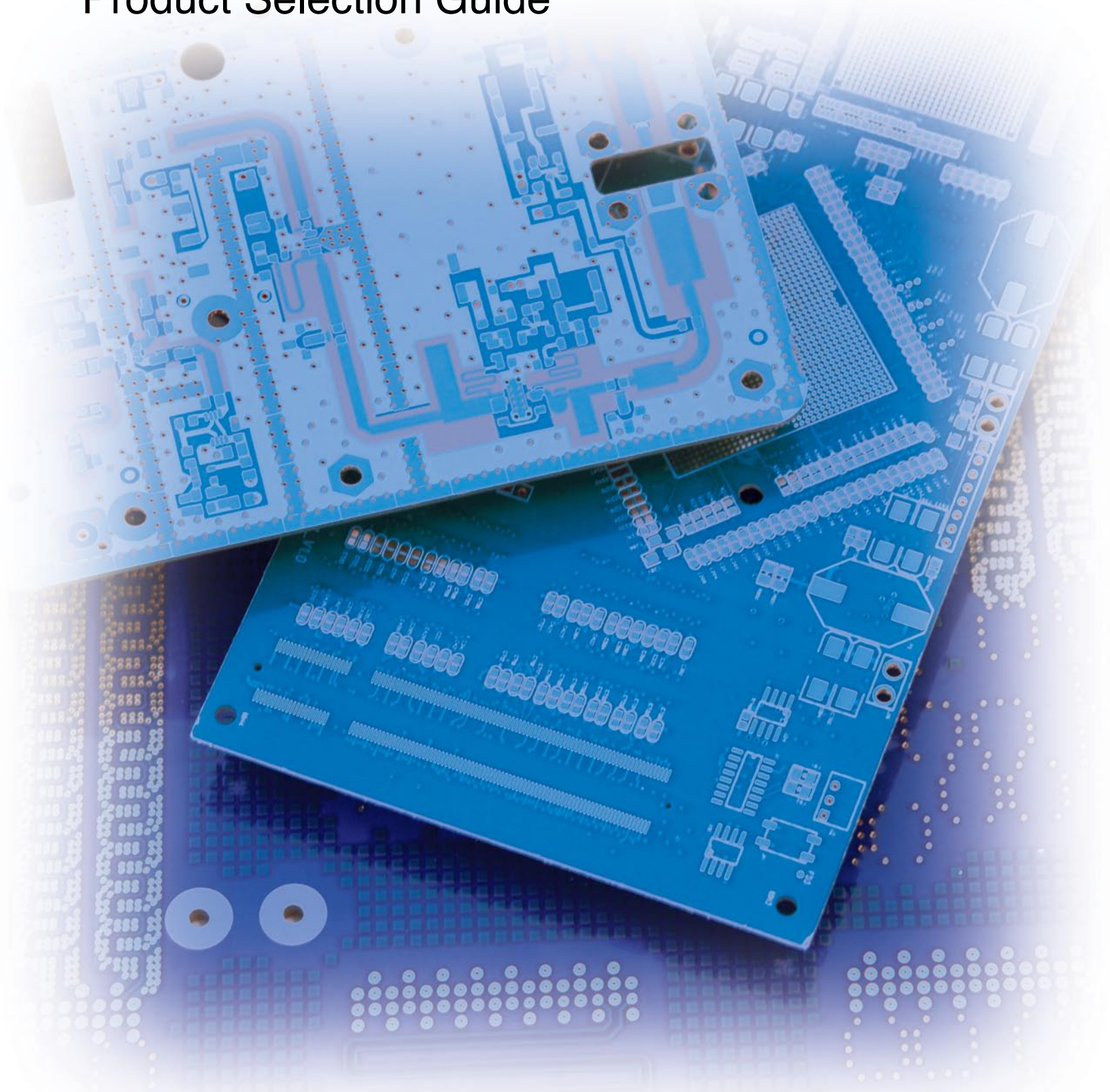


# TACONIC

*Finding a better way*

## Advanced PCB Materials

### Product Selection Guide



[www.taconic-add.com](http://www.taconic-add.com)

An ISO 9001:2000 Registered Company

## Taconic High Performance Material Properties

Part #	Composition	Dk	Df	Volume Resistivity Mohm/cm	Surface Resistivity Mohm	Flex Strength K psi		Moisture Absorption %	k <sub>r</sub> W/m/K	CTE ppm/°C			Peel Strength lbs/in 1 oz Cu
						MD	CD			x	y	z	
TLY-5A	PTFE - Glass	2.17 <sup>(a)</sup>	0.0009 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>12	>10	<0.02	0.22	20	20	280	12
TLY-5	PTFE - Glass	2.20 <sup>(a)</sup>	0.0009 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>12	>10	<0.02	0.22	20	20	280	12
TLY-3	PTFE - Glass	2.33 <sup>(a)</sup>	0.0012 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>12	>10	<0.02	0.22	20	20	280	12
HT 1.5	Bonding Film	2.35	0.0025					0.005					
TLX-0	PTFE - Glass	2.45 <sup>(a)</sup>	0.0019 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>23	>19	<0.02	0.14	9	12	140	12
TLX-9	PTFE - Glass	2.50 <sup>(a)</sup>	0.0019 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>23	>19	<0.02	0.14	9	12	140	12
TLX-8	PTFE - Glass	2.55 <sup>(a)</sup>	0.0019 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>23	>19	<0.02	0.14	9	12	140	12
TLX-7	PTFE - Glass	2.60 <sup>(a)</sup>	0.0019 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>23	>19	<0.02	0.14	9	12	140	12
TLX-6	PTFE - Glass	2.65 <sup>(a)</sup>	0.0019 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>23	>19	<0.02	0.14	9	12	140	12
TLC-27	PTFE - Glass	2.75 <sup>(a)</sup>	0.0030 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>40	>35	<0.02	0.24	9	12	70	12
TLE-95	PTFE - Glass	2.95 <sup>(a)</sup>	0.0026 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>35	>30	<0.02	0.28 <sup>(e)</sup>	9	12	70	12
TLC-30	PTFE - Glass	3.00 <sup>(a)</sup>	0.0030 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>40	>35	<0.02	0.24	9	12	70	12
TPG-30	Prepreg	3.00	0.0038	10 <sup>8</sup>	10 <sup>9</sup>	19.9	14.9	0.13	0.25	21	23	28	13
TLG-30	PTFE Ceramic - Glass	3.00	0.0026	10 <sup>7</sup>	10 <sup>6</sup>	20	22.1	0.16	0.27	8	12	61	13
RF-30	PTFE Ceramic - Glass	3.00 <sup>(b)</sup>	0.0014 <sup>(b)</sup>	10 <sup>9</sup>	10 <sup>8</sup>	>13	>9	<0.02	0.20	11	21	125	10
TSM-30	PTFE Ceramic - Glass	3.00 <sup>(c)</sup>	0.0015 <sup>(c)</sup>	10 <sup>8</sup>	10 <sup>7</sup>	>6.9	>6	0.03	0.27	23	28	78	8
TLC-32	PTFE - Glass	3.20 <sup>(a)</sup>	0.0030 <sup>(a)</sup>	10 <sup>7</sup>	10 <sup>7</sup>	>40	>35	<0.02	0.24	9	12	70	12
TPG-35	Prepreg	3.50	0.0050	10 <sup>8</sup>	10 <sup>9</sup>	19.9	14.9	0.13	0.25	21	23	28	13
TLG-35	PTFE Ceramic - Glass	3.50 <sup>(c)</sup>	0.0030 <sup>(c)</sup>	10 <sup>7</sup>	10 <sup>6</sup>	20	22.1	0.16	0.27	8	12	61	13
RF-35	PTFE Ceramic - Glass	3.50 <sup>(b)</sup>	0.0018 <sup>(b)</sup>	10 <sup>9</sup>	10 <sup>8</sup>	>22	>18	0.02	0.24	19	24	64	10
RF-35A	PTFE Ceramic - Glass	3.50 <sup>(b)</sup>	0.0016 <sup>(b)</sup>	10 <sup>9</sup>	10 <sup>8</sup>	24	14	0.03	0.28	10	13	106	12
RF-35P	PTFE Ceramic - Glass	3.50 <sup>(b)</sup>	0.0025 <sup>(b)</sup>	10 <sup>8</sup>	10 <sup>7</sup>	>28	>16	0.03	0.27	15	15	110	10
RF-41	PTFE Ceramic - Glass	4.10 <sup>(d)</sup>	0.0038 <sup>(c)</sup>	10 <sup>8</sup>	10 <sup>7</sup>	20.7	18.5	<0.02	0.29	9	12	93	8
RF-43	PTFE Ceramic - Glass	4.30 <sup>(d)</sup>	0.0033 <sup>(c)</sup>	10 <sup>7</sup>	10 <sup>5</sup>	20.1	18.8	≤0.02	0.30	9	11	96	7
RF-45	PTFE Ceramic - Glass	4.50 <sup>(d)</sup>	0.0037 <sup>(c)</sup>	10 <sup>8</sup>	10 <sup>6</sup>	20.7	19.3	≤0.04	0.33	9	13	96	9
RF-60A	PTFE Ceramic - Glass	6.15 <sup>(d)</sup>	0.0028 <sup>(a)</sup>	10 <sup>8</sup>	10 <sup>8</sup>	>18.3	>14.6	0.02	0.54	9	8	69	8
CER-10 (0.0620)	PTFE Ceramic - Glass	10.0 <sup>(d)</sup>	0.0035 <sup>(a)</sup>	10 <sup>8</sup>	10 <sup>8</sup>	>16.5	>15.5	0.02	0.63	13	15	46	5

<sup>(a)</sup> Measured by IPC-TM-650 method 2.5.5.5 (stripline resonator) at 10 GHz

<sup>(b)</sup> Measured by IPC-TM-650 method 2.5.5.5.1 (modified stripline) at 1.9 GHz

<sup>(c)</sup> Measured by IPC-TM-650 method 2.5.5.5.1 (modified stripline) at 10 GHz

<sup>(d)</sup> Measured by IPC-TM-650 method 2.5.5.6 (full sheet resonant)

<sup>(e)</sup> Measured by ASTM E1461

TacPreg<sup>®</sup> prepregs are available in grades TPG-30 and 35  
 TacLam<sup>®</sup> laminates are available in grades TLG-30 and 35  
 UL Rating for all products: 94 V-0

## Copper Cladding

Copper Designation	Surface Roughness $R_{MS}$ Treated side		Surface Roughness $R_{MS}$ Untreated side		Description	Thickness	
	Microinches	Microns	Microinches	Microns		Mils	Micrometers
RH	16	0.4	7	0.2	Rolled-Annealed 1/2 oz	0.7	17.5
R1	11	0.3	7	0.2	Rolled-Annealed 1 oz	1.4	35.0
CLH	13	0.3	20	0.5	Reverse treated Electrodeposited 1/2 oz	0.7	17.5
CL1	13	0.3	25	0.6	Reverse treated Electrodeposited 1 oz	1.4	35.0
CVH (CH)	27	0.7	11	0.3	Very Low Profile Electrodeposited 1/2 oz	0.7	17.5
CV1 (C1)	25	0.6	11	0.3	Very Low Profile Electrodeposited 1 oz	1.4	35.0
C2	77	2.0	8	0.2	Electrodeposited 2 oz	2.8	70.0

Ohmega Ply®, Ticer® and other resistive films available upon request. Please contact Taconic for availability.

## Heavy Metal Cladding - Available Upon Request

Heavy Metal	Specific Gravity	$k_T$ W/m/K	CTE ppm/°C	Machinability
Brass	8.5	120	20	Very Good
Copper	8.9	390	17	Good
Aluminum	2.7	180	24	Fair

## Standard Sizes - Custom Sizes Available

Typical Size		Long Laminates		Cut Sizes	
Inches	mm	Inches	mm	Inches	mm
36 x 48	914 x 1220	36 x 60	914 x 1524	12 x 18	304 x 457
		36 x 76	914 x 1930	16 x 18	406 x 457
		36 x 102	914 x 2590	18 x 24	457 x 610
				16 x 36	406 x 914
		24 x 36	610 x 914		

## Specialty Products - Prepregs & Laminates

**HyRelex®** is Taconic's family of low loss, high reliability, flexible laminates and bonding materials.

HyRelex® Laminates			
Material	Dk	Thickness	
		inches	mm
TF-260	2.60	0.0017, 0.0030	0.04, 0.08
TF-290	2.90	0.0023, 0.0035	0.06, 0.09

**TacLampplus®** is a cost-effective, laser-ablatable, non-reinforced microwave substrate that can be used to create very low loss structures. Applications include MMIC packaging and mm-wave sensors.

Material	Dk	Thickness	
		inches	mm
TacLampplus	2.20	Increments of 0.0020	Increments of 0.05

**TacLam® & TacPreg®** are available in thin-core constructions for high speed digital, RF multilayer and military applications.

TacLam® Laminates			
Material	Dk	Thickness	
		inches	mm
TLG-30	3.00	0.0040, 0.0080, 0.0120	0.10, 0.20, 0.30
TLG-35	3.50	0.0600	1.52

TacPreg® Prepregs			
Material	Dk	Thickness	
		inches	mm
TPG-30	3.00	0.0045, 0.0050	0.11, 0.13
TPG-35	3.50	0.0045	0.11

All reported values are typical and should not be used for specification purposes. In all instances the user shall determine suitability in any given application. The above information creates no express or implied warranties.

Ohmega Ply® is a registered trademark of Ohmega Technologies, Inc. Ticer® is a registered trademark of Ticer Technologies.

## Standard Sizes & Thicknesses

Product	Available Thickness		Thickness Tolerance	
	(inches)	(mm)	(inches)	(mm)
TLY-3, 5, 5A	0.0050 (TLY-3, 5)	0.13	+/- 0.0005	+/- 0.01
	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
	0.0930	2.36	+/- 0.0030	+/- 0.08
TacBond HT 1.5	0.0015	0.04		
TLX (TLT)-6, 7, 8, 9, 0	0.0050	0.13	+/- 0.0005	+/- 0.01
	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
	0.0930	2.36	+/- 0.0030	+/- 0.08
TLC-27	0.0145	0.37	+/- 0.0010	+/- 0.03
TLE-95	0.0035	0.09	+/- 0.00025	+/- 0.01
	0.0052	0.13	+/- 0.0005	+/- 0.01
	0.0100	0.25	+/- 0.0007	+/- 0.02
TPG-30	0.0045	0.11		
	0.0050	0.13		
TLG-30, 35	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	as agreed upon between customer and supplier	
	0.1200	3.05		
TLC-30, 32	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0450	1.14	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
	0.0930	2.36	+/- 0.0030	+/- 0.08
RF-30	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05
TSM-30	0.0050	0.13	+/- 0.0007	+/- 0.02
	0.0100	0.25	+/- 0.0010	+/- 0.03
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05

Product	Available Thickness		Thickness Tolerance	
	(inches)	(mm)	(inches)	(mm)
TPG-35	0.0045	0.11		
RF-35	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0030	+/- 0.08
RF-35A	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0300	0.76	+/- 0.0020	+/- 0.05
RF-35P	0.0020	0.05	+/- 0.0005	+/- 0.01
	0.0040	0.10	+/- 0.0005	+/- 0.01
	0.0060	0.15	+/- 0.0005	+/- 0.01
	0.0080	0.20	+/- 0.0007	+/- 0.02
RF-41	0.0600	1.52	+/- 0.0020	+/- 0.05
	0.1250	3.18	+/- 0.0035	+/- 0.09
RF-43	0.0100	0.25	+/- 0.0010	+/- 0.03
	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0300	0.76	+/- 0.0015	+/- 0.04
	0.0620	1.58	+/- 0.0020	+/- 0.05
RF-45	0.1250	3.18	+/- 0.0035	+/- 0.09
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0310	0.79	+/- 0.0020	+/- 0.05
RF-60A	0.0620	1.58	+/- 0.0020	+/- 0.05
	0.1250	3.18	+/- 0.0035	+/- 0.09
	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0250	0.64	+/- 0.0020	+/- 0.05
	0.0310	0.79	+/- 0.0020	+/- 0.05
Cer-10	0.0500	1.27	+/- 0.0030	+/- 0.08
	0.0600	1.52	+/- 0.0030	+/- 0.08
	0.1250	3.18	+/- 0.0040	+/- 0.10
	0.0110	0.28	+/- 0.0010	+/- 0.03
	0.0250	0.64	+/- 0.0020	+/- 0.05
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0470	1.19	+/- 0.0030	+/- 0.08
0.0620	1.58	+/- 0.0030	+/- 0.08	
0.1250	3.18	+/- 0.0040	+/- 0.10	

Custom Sizes & Thicknesses  
Available Upon Request

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